

Having thus described the preferred embodiments,  
the invention is now claimed to be:

1. A method of irradiating fluoropolymer  
material comprising:

removing oxygen and oxygen containing gases from  
an irradiation chamber;

5 irradiating the irradiation chamber with  
penetrating ionizing radiation;

passing fluoropolymer material through the  
ionizing radiation in the oxygen and oxygen containing gas  
depleted environment of the irradiation chamber.

2. The method as set forth in claim 1 wherein  
the irradiating step includes pulsing accelerated  
electrons through the irradiation chamber.

3. The method as set forth in claim 1 wherein  
the irradiating step includes:

accelerating electrons;

5 directing the accelerated electrons through the  
irradiation chamber to break chemical bonds in and  
electrically charge the fluoropolymer material.

4. The method as set forth in claim 3 further  
including:

5 applying one of magnetic and electromagnetic  
fields to cause rotation of the charged fluoropolymer  
material in the irradiation chamber.

5. The method as set forth in claim 3 wherein  
the removing step includes:

removing air and water vapor from the  
irradiation chamber.

6. The method as set forth in claim 1 further  
including cooling irradiated polymeric material.

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7. The method as set forth in claim 1 wherein the depleting of oxygen and oxygen containing gases from the irradiation chamber includes:

drawing a vacuum in the irradiation chamber.

8. The method as set forth in claim 7 wherein the vacuum is at least  $10^{-1}$  Torr.

9. The method as set forth in claim 8 wherein the vacuum is at least  $10^{-4}$  Torr.

10. The method as set forth in claim 1 further including:

entraining the fluoropolymer material in gas and passing the gas through the irradiation chamber;

5 after passing the entrained fluoropolymer material through the irradiation chamber, separating the fluoropolymer material from the gas;

recirculating the gas / to entrain more fluoropolymer material.

11. The method as set forth in claim 1 wherein the irradiation chamber is a sealable container and further including:

5 sealing a batch of the fluorocarbon material in the container;

the removing step includes reducing oxygen and oxygen containing gases by drawing a vacuum in the container; and

10 the passing step includes passing the container through the ionizing radiation.

12. The method that is set forth in claim 11, wherein the ionized radiation is a pulsed electron beam.

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13. An apparatus for irradiating fluoropolymer materials comprising:

a radiation source for generating a beam of radiation;

5 an irradiation chamber through which the beam of radiation passes;

a vacuum pump for drawing down oxygen and oxygen and oxygen containing gases from the irradiation chamber; and

10 a source of fluoropolymer material for supplying fluoropolymer material to the irradiation chamber.

14. The apparatus as set forth in claim 13 further including:

a cooler for cooling the material which has been irradiated in the irradiation chamber.

15. ~~The~~ apparatus as set forth in claim 16 wherein the radiation source includes:

a particle accelerator which accelerates electrons; and

5 a scan horn which fans the electrons into an electron beam directed into the irradiation chamber.

16. The apparatus as set forth in claim 13 wherein the radiation source is a pulsed electron accelerator.

17. The apparatus--as set forth in claim 13 further including:

at least one of magnets and electromagnetic coils disposed adjacent the irradiation chamber for  
5 reorienting the fluoropolymer material.

18. The apparatus as set forth in claim 13 further including:

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an entraining mechanism for entraining particulate fluoropolymer material into a stream of oxygen depleted gas;

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a pneumatic conduit for conveying entrained fluoropolymer material from the entraining mechanism to the irradiation chamber;

a separator disposed downstream from the irradiation chamber for separating the fluoropolymer material from the entraining gas;

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another pneumatic conduit which conveys gas from the separator back to the entraining mechanism; and

a pump for circulating the gas.

19. The apparatus as set forth in claim 18 further including:

a chiller disposed between the irradiation chamber and the separator.

20. The apparatus as set forth in claim 13 wherein the irradiation chamber with received fluoropolymer material is pumped down to a vacuum of at least  $10^{-1}$  Torr and further including a conveyor for conveying the irradiation chamber through the radiation beam.

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